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THE

MISSISSIPPI

AND

ITS AFFLUENTS.

BY S. WATERHOUSE

OF

WASHINGTON UNIVERSITY.

ST. LOUIS, JANUARY 1, 1892.

Commerce and Improvement of Our Midland Rivers.

It is the aim of these pages to show the commercial importance of our midland river system and the necessity of an early removal from the Mississippi and its main tributaries of every obstruction to their navigation. The courtesy of Hon. R. P. Porter, superintendent of the United States census, has recently furnished me with sta-

TABLE NO. 1—EQUIPMENT.

NUMBER, TONNAGE, AND VALUE OF ALL STEAMERS AND UNRIGGED CRAFT (OVER 5 TONS) OWNED ON THE RIVERS OF THE MISSISSIPPI VALLEY IN 1889.

RIVERS.	STEAMERS.		
	NO.	TONNAGE.	VALUE.
Total for Mississippi Valley.	1,106	210,771.89	$10,539,251
Upper Mississippi	188	24,978.21	$1,485,369
St. Croix	15	1,258.35	99,000
Chippewa	1	108.00	7,000
Illinois	9	1,860.25	80,200
Missouri, Osage, & Gasconade	52	4,759.84	209,700
Total for Upper Mississippi System	265	32,964.65	$1,881,269
Ohio	380	85,035.62	$4,099,177
Allegheny	6	715.84	53,000
Monongahela	48	6,234.15	419,600
Muskingum	7	567.79	25,050
Little Kanawha	5	228.18	18,000
Great Kanawha	21	2,386.13	123,333
Big Sandy	8	787.67	40,000
Kentucky	5	374.31	21,000
Green	5	316.68	13,500
Wabash	3	297.00	10,000
Cumberland	17	2,935.57	109,300
Tennessee	32	7,316.89	260,750
Total for Ohio System	537	107,195.83	$5,192,710
Lower Mississippi	257	62,476.07	$3,152,372
White	5	1,229.71	45,000
Arkansas	15	4,098.73	66,200
Yazoo	11	1,409.68	62,000
Washita	3	994.52	45,000
Red River	9	1,968.88	80,700
Total for Lower Mississippi System	300	70,177.59	$3,451,272
Red River of the North	4	433.82	$14,000

tistics which exhibit the magnitude of our river commerce. These tables—prepared under the supervision of Mr. Vivian, special agent of the Census Bureau—were accompanied by the following letter of explanation:—

"Your letter to Superintendent Porter, asking for facts regarding the commerce on the Mississippi and affluents, has been referred to me, and in reply I beg to send you three tables, as follows:

"1. Equipment—showing the number, tonnage, and value of all steamers and unrigged craft reported on in the Mississippi valley for 1889.

TABLE NO. 1—CONTINUED.

UNRIGGED.			TOTAL.		
NO.	TONNAGE.	VALUE.	NO.	TONNAGE.	VALUE.
6,339	3,182,608.00	$4,795,754	7,445	3,393,379.89	$15,338,005
285	165,685.00	$214,018	473	190,663.12	$1,699,387
11	10,000.00	11,000	26	11,258.35	110,000
.....	.....	.....	1	108.00	7,000
.....	.....	.....	9	1,860.25	80,200
52	4,898.00	30,705	104	9,657.84	240,405
348	180,583.00	$255,723	613	213,547.65	$2,136,992
4,488	2,355,846.00	$2,858,336	4,868	2,440,881.62	$6,957,513
26	2,340.00	10,400	32	3,055.84	63,400
110	16,653.00	30,100	158	22,887.15	449,700
72	7,803.00	28,465	79	8,370.79	53,515
48	4,744.00	12,000	53	4,972.18	30,000
872	409,980.00	521,705	893	412,366.13	645,038
9	3,150.00	4,000	17	3,937.67	44,000
3	165.00	1,100	8	539.31	22,100
.....	.....	.....	5	316.68	13,500
.....	.....	.....	3	297.00	10,000
20	1,870.00	4,300	37	4,805.57	113,600
60	10,722.00	33,225	92	18,038.89	293,975
5,708	2,813,273.00	$3,503,631	6,245	2,920,468.83	$8,696,341
250	175,510.00	$1,001,250	507	237,986.07	$4,153,622
1	40.00	100	6	1,269.71	45,100
7	310.00	1,400	22	2,408.73	67,600
9	1,670.00	17,450	20	3,079.68	79,450
.....	.....	.....	3	994.52	45,000
5	250.00	5,000	14	2,218.88	85,700
272	177,780.00	$1,025,200	572	247,957.59	$4,476,472
11	10,972.00	$11,200	15	11,405.82	$25,200

"2. Traffic—showing the passengers carried and tons of freight moved on all operating craft of the valley in 1889.

TABLE NO. 2—TRAFFIC.

PASSENGERS CARRIED, TONS OF FREIGHT MOVED, AND MILES TRAVELED BY ALL CRAFT (OVER 5 TONS) OPERATING ON THE RIVERS OF THE MISSISSIPPI VALLEY IN 1889.

RIVERS AND THEIR TRIBUTARIES.
Grand Total, Mississippi Valley
Upper Mississippi
St. Croix
Chippewa
Illinois
Missouri, Osage, and Gasconade
Total, Upper Mississippi System
Ohio River
Allegheny
Monongahela
Muskingum
Little Kanawha
Great Kanawha
Big Sandy
Kentucky
Green River
Wabash
Cumberland
Tennessee
Total, Ohio System
Lower Mississippi
White River
Arkansas
Yazoo
Washita
Red River
Total, Lower Mississippi System
Red River of the North

"3. Income and Expenditure—showing the gross earnings, expenses, and net earnings of all operating craft of the valley in 1889.

"These tables, I think, are almost self-explanatory, and but one or two terms need any remarks. For instance, by 'unrigged' is meant all towed craft, such as barges, flats, scows, &c. The freight is that carried on these barges, principally grain in

TABLE NO. 2—CONTINUED.

PASSENGERS CARRIED.			FREIGHT MOVED IN TONS.	MILES TRAVELED BY ALL STEAMERS.
REGULAR AND EXCURSION.	FERRY.	TOTAL.		
2,384,248	8,474,646	10,858,894	29,405,046	7,316,545
285,676	1,192,409	1,478,085	4,486,421	1,101,990
304	12,000	12,304	846,816	67,990
4,441	.....	4,441	325,477	12,000
21,768	28,600	50,368	180,264	83,436
26,561	249,975	276,536	1,119,362	159,239
338,750	1,482,984	1,821,734	6,958,340	1,424,655
1,191,732	3,924,074	5,115,806	7,770,565	2,696,020
5,319	.....	5,319	365,946	2,040
130,537	130,850	261,387	3,294,932	130,898
37,681	.....	37,681	10,281	27,055
9,451	.....	9,451	115,657	14,740
53,599	38,525	92,124	1,145,202	59,680
11,000	.....	11,000	286,483	47,350
9,550	.....	9,550	256,950	12,588
11,200	.....	11,200	819,278	10,300
180	.....	180	93,178	12,700
19,160	.....	19,160	974,316	144,968
27,185	903,100	930,285	909,078	420,894
1,506,594	4,996,549	6,503,143	16,041,866	3,579,233
518,267	1,933,048	2,451,315	*4,374,761	1,826,254
4,183	.....	4,183	86,393	68,786
2,651	62,065	64,716	1,663,817	61,689
5,391	.....	5,391	77,380	121,216
1,204	.....	1,204	93,707	60,828
7,208	.....	7,208	105,145	172,800
538,904	1,995,113	2,534,017	*6,401,203	2,311,573
.....	.....	.....	3,637	1,084

*Respectively, 7,754,491 tons, 9,820,833 tons, and 31,897,565 tons, including the coal and lumber brought into and carried on Lower Mississippi from the Upper Mississippi and Ohio Rivers.

bulk and coal; that carried on regular freighting steamers, and that carried on those ferries that are not considered as links of railroads, except that carried on such large concerns as the Wiggins

TABLE NO. 3—INCOME AND EXPENDITURE.

GROSS EARNINGS, EXPENSES, AND NET EARNINGS OF ALL CRAFT (OVER 5 TONS) OPERATING ON THE RIVERS OF THE MISSISSIPPI VALLEY IN 1889.

RIVERS.	GROSS EARNINGS.	EXPENSES.	NET EARNINGS.
Total for Miss. Valley..	$16,335,503	$12,598,342	$3,737,161
Red River of the North.	$5,661	$4,246	$1,415
Upper Mississippi.....	$1,994,786	$1,403,746	$591,040
St. Croix.....	169,184	93,703	75,481
Chippewa	18,244	9,844	8,400
Illinois.....	134,771	113,047	21,724
Missouri, Osage, and Gasconade.....	294,470	229,477	64,993
Total for Upper Mississippi System.....	$2,611,455	$1,849,817	$761,638
Ohio	$5,070,654	$4,000,777	$1,069,877
Allegheny	20,630	18,449	2,181
Monongahela.....	496,930	398,861	98,069
Muskingum	55,482	40,589	14,893
Little Kanawha	30,921	17,343	13,578
Great Kanawha.....	192,006	138,677	53,329
Big Sandy.....	94,918	69,879	25,039
Kentucky.....	58,821	33,866	24,955
Green.....	31,889	27,154	4,735
Wabash	42,320	22,140	20,180
Cumberland	205,636	170,939	34,697
Tennessee	400,806	330,893	69,913
Total for Ohio System.....	$6,701,013	$5,269,567	$1,431,446
Lower Mississippi.....	$6,236,310	$4,849,939	$1,386,371
White.....	100,697	82,443	18,254
Arkansas	86,383	56,549	29,834
Yazoo	144,068	125,469	18,599
Washita	125,180	103,220	21,960
Red River.....	324,736	257,092	67,644
Total for Lower Mississippi System.....	$7,017,374	$5,474,712	$1,542,662

Ferry Company of St. Louis, the Waterloo and Carondelet Ferry—concerns where the tonnage of freight carried is unknown. The year 1889 is from January 1 to December 31. The business of each

river is that of the river itself and its tributaries; that is, for example, the business done on the Cheat and the Buckhannon is included in the report of the Monongahela. In the case of the upper Mississippi, the Ohio, and the lower Mississippi—used as titles for the three systems—the business of the unmentioned tributaries is included, but not that of those mentioned as forming the system. For instance, the business of the upper Mississippi includes that of the Minnesota, Galena, Red, Cedar, &c.; that of the Ohio includes the business of the Guyandotte and Licking; and that of the lower Mississippi includes the business of the bayous, the Big Hatchie, the Kaskaskia, the Big Black, &c. In every case, where at all possible, the commerce is that of each river; that is, only such freight is allowed to a river as had its origin there. The foot-note to the table of traffic gives an illustration of what the figures would be, if the overlapping freight from one river into another were considered as actual traffic. The traffic of St. Louis by river is divided. That from the upper Mississippi and Ohio is given to those rivers, as is that from St. Louis to points on those rivers; that to and from St. Louis and points on the lower Mississippi is given to that river, and the local business of St. Louis is given to the lower Mississippi. Similar dispositions are made of the equipment and expense accounts.

"I trust that these explanations will be sufficient to a proper understanding of the tables."

The fulness of these tables obviates the need of a lengthy discussion. The figures are arguments which scarcely require a verbal expression. The cogency of the facts is far more convincing than the illustrations of rhetoric. The efficiency of the Mississippi as a means of commercial intercourse depends upon the freedom of its channel from obstructions. In view of the frequent interruptions of navigation, the amount of freights borne on the Mississippi is surprisingly large. But, if its channel were always deep enough for the passage of boats, the aggregates would be immensely greater. The delays which shallows cause deter merchants from sending their goods by the water route. Last sum-

mer the river was exceptionally low. The experiences of a holiday excursion impressed me with a vivid sense of the obstacles which at times embarrass the navigation of the Mississippi. On my way to St. Paul and back, fifty hours were spent on sand bars. The various detentions arising from low water protracted the round trip nine days beyond the schedule time. There was a sufficient flow of water for unobstructed navigation, if it had only been restricted to a narrow channel. On the upper river, the wing-dams are numerous and effective. Indeed, without them the shallows would have been wholly impassable. But there are still scores of shoals which the Government has neglected to remove. At only a few places were forces of men at work upon the improvement of the channel. The example of France in providing facilities for commercial intercourse affords an instructive lesson to the United States. In France, from the days of the great Vauban, adequate expenditures of the public wealth have hastened to completion every work that promoted the national interests. But in this country, a false system delays the usefulness and increases the cost of public improvements. In consequence of the irregularity and insufficiency of Congressional appropriations, works commenced by the Government sometimes fall into partial decay before they can be finished. The cost of reconstructing them is a great and unnecessary expense. Even the richest nation in the world can not afford such wasteful extravagance. True frugality requires an annual grant of funds ample enough for the seasonable completion of public improvements. Our present impolicy renders the upper Mississippi almost unnavigable at low stages of water, deprives our great waterway of its vast usefulness as a means of transportation and as a regulator of railroad freights, and debars the cities on its banks from the prosperity which a flourishing river trade would create. A statesmanship broad as the interests of our country and heedless of mistaken conceptions of public economy ought to make regular and adequate provision for deepening the channel of the Mississippi River.

The course of foreign governments is sagaciously different from our own. For a century, the great nations beyond the Atlantic, clearly recognizing the sources of public prosperity, have been effectively carrying out systems of internal improvement. If the Mississippi were in Europe, everything which imperial wealth and engineering skill could accomplish would long since have been done to free its channel from every obstacle to its usefulness. The enterprise of Americans is a national boast; but, in the prosecution of great public works, Europeans have been more progressive than our own countrymen. In their management of internal improvements, Americans might profitably follow the guidance of foreign examples.

The preceding tables show how vast a commerce now floats on the Mississippi and its affluents, but their tonnage would be incalculably greater, if these streams were always navigable.

The improvement of the Mississippi is a vast undertaking. The permanent accomplishment of this work is perhaps impossible. The ever shifting sands of an alluvial bed constantly renew the tasks of the engineer. But doubtless the combined forces of science and capital, which have overcome so many seemingly insuperable difficulties, will be able to maintain navigable channels in all our great rivers. The inadequacy of small grants is an urgent reason for larger appropriations. False theories of frugality should not be suffered to prevent the improvement of waterways which, if kept open, would cheapen every form of commercial transportation. While Congressional allowances ought to be more liberal, the field of operations should be restricted. The Government funds are dissipated over too large an area to be effective. A concentration of effort would be more conducive to success. Should the unprofitable policy of retrenchment prevail, it would seem best to limit the expenditure of public moneys to the improvement of the main streams. Perhaps, even in the event of ample appropriations, such a restriction would be the wisest course. Minor interests should yield to the general welfare. If experience may be taken as a guide, simultaneous operations upon all our

waterways are seldom productive of much good. The work is too slight, disconnected, and intermittent to accomplish the object. If the labor and money frittered away on all our rivers were spent on one, that stream would be opened from its mouth to the limit of navigation. Rapid and effective work implies concentration. Our rivers should be severally improved in the order of their size and commercial importance. But if the urgency of public sentiment will not permit a separate and successive progress, then the Mississippi, Ohio, and Missouri should be the first to receive attention. The deepening of the main channels would ensure the improvement of the tributaries. If Congress would only subordinate unimportant needs to the great interests of the nation, our western rivers would soon be free from obstructions.

The States which lie in the Mississippi valley are large and powerful. Their united action could control national legislation and secure larger appropriations for the improvement of our great midland watercourses. The active co-operation of western governors, State legislators, and members of Congress would facilitate the solution of a difficult problem. A definite policy, urged by the unanimous sentiment of our central States, would hardly be rejected by Congress. If our Government should fail to make adequate provision for the improvement of our waterways, the chief responsibility for the failure would rest on the dissensions of jealous and ruinously selfish constituencies. Harmony of action and a statesmanship that rises above petty local needs to the heights from which patriotism surveys national interests would soon increase the commercial efficiency of our great midland rivers.

Congress can not afford to neglect the momentous interests of western navigation. But an intelligent care of the Mississippi requires far-sighted legislation. Dredging, the construction of wing-dams, the release, in seasons of drought, of waters stored in the lakes of Minnesota, and the inflow from Lake Michigan, after the completion of the Rock Island canal, will afford a partial relief.

But there are remote and grave difficulties—not less grave because remote—which Congress only

can obviate. Scientific observation records a gradual lowering of the waters of the Mississippi and of the great northern lakes. The cause of this subsidence is the felling of northern forests. Long ago foreign nations learned the imprudence of denuding their woodlands. The extinction of valuable plants, the disappearance of birds useful to the farmer, the diminished rainfall, the shallowed streams, and the lessened productiveness of the soil were disasters which only imperial hands were able to retrieve. And now, throughout Europe and India, wise and rigorous forestry laws prevent any wanton or dangerously extensive destruction of trees. When any large area is stripped of its woods, the amount of precipitation always decreases, and the rainfall, instead of being absorbed by the earth and slowly filtering into the watercourses, flows quickly from the surface and swells the streams with a sudden and transient rise. In the event of heavy and continuous rains, the rapid efflux of the waters causes destructive floods. Unless our Government takes effective measures to arrest the felling of our northwestern forests, the lessening volume of the Mississippi will in the coming time be obstructed by still greater impediments to navigation.

The improvement of the waterways which cheapen the food of mankind and facilitate the exchanges of domestic and foreign commerce challenges the best thought of American statesmen.

The promotion of the vast interests which the river system of the Mississippi Valley represents is a proud distinction. It is hoped that our Congressmen, with a patriotism grandly superior to mere local wants, will take prompt and efficient steps to fit these majestic streams for their destined careers of national usefulness.

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